RMS U.S. and Canada Severe Convective Storm Models

Providing Insights Into Severe Weather Risk That Go Beyond Intuition and Historical Experience

KEY FEATURES

- **Geographic coverage:** The contiguous U.S. (48 states) and 10 Canadian provinces below 60°N

- **Perils modeled:** hail, tornado, straight-line wind, lightning

- **Lines of business:** All key lines of business, including residential, commercial, industrial, agricultural, telecommunications, and automobile

- **Risk types:** Over 800 unique vulnerability curves are represented across 11 vulnerability regions

Overview

Severe convective storms can cause damage year-round throughout the contiguous U.S. and southern Canada. Events range from localized, isolated thunderstorms to multi-day, multi-state outbreaks.

Collectively, severe weather has grown to be one of the costliest perils in North America. Such events can cause on average over US$15 billion in insured losses in the U.S. and more than C$1 billion in Canada, according to RMS®.

Despite being such a major risk to the industry, many (re)insurers opt to manage severe convective storm risk using historical experience alone.

However, with recent trends in industry claims practices, event severity, and growing exposure concentrations within risk-prone regions, it's becoming clearer that past hazard and loss patterns may not reflect those in the future. Historical experience, while important, may lead to inadequate use of capacity, biased representation of risk where events have been over- or under-reported, or misinformed reinsurance purchasing decisions. All of which can erode a carrier's bottom line.

Addressing Gaps and Biases While Capturing Recent Trends

The (re)insurance industry requires a solution that addresses the limitations associated with the incomplete historical record and captures recent and emerging trends in the risk landscape. A solution that provides insight that goes beyond portfolio management, enabling the market to be more knowledgeable, competitive, and profitable when managing severe weather risk.

As the only solution to represent all potential sources of loss across a full spectrum of events, the RMS U.S. and Canada Severe Convective Storm Models provide the most comprehensive and accurate view of North America's severe weather risk landscape all in one place.

Advanced Hybrid Modeling Methodology

RMS employs a hybrid modeling methodology as the foundation of the U.S. and Canada severe convective storm model solution. Established in 2008 as an industry first, this methodology combines the strengths of both statistical and numerical modeling approaches with detailed claims results, allowing RMS to fill the gaps and biases associated with incomplete historical data, accurately model the atmospheric drivers and spatial distribution of severe weather events, and characterize hazard for individual sub-perils while maintaining proper severity of losses.
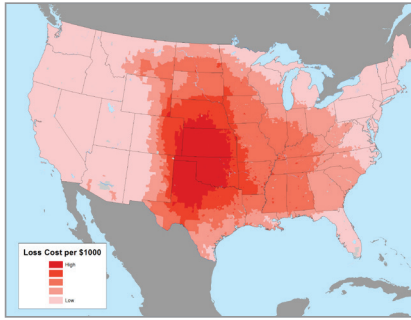
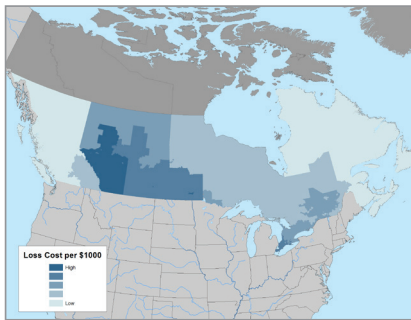Figure 1: Loss cost per $1000 USD – Residential Lines – U.S. Severe Convective Storm

Figure 2: Loss cost per $1000 CAD – Residential Lines – Canada Severe Convective Storm

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RMS

RMS is the world's leading catastrophe risk modeling company. From earthquakes, hurricanes, and flood to terrorism and infectious diseases, RMS helps financial institutions and public agencies understand, quantify, and manage risk.

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This approach allows carriers to assess potential future losses where the historical record is limited or in regions that have not sustained losses to date. It also enables RMS to model the correlations of severe weather events within and across regions, supporting effective accumulation management and portfolio growth or diversification strategies.

Complete Spectrum of Damaging Events

The models reflect the ability to assess annual and aggregate risk against the most complete spectrum of both cat and non-cat severe convective storm events. Cat events are reflected within the low-frequency (high-severity) event set, while non-cat events are reflected within a separate high-frequency (low-severity) event set (the latter capturing impacts from all possible non-cat events).

This enables a truly comprehensive view of severe weather risk – from isolated thunderstorms to tail events and major outbreaks – providing insurance portfolio managers deeper insights into their attritional risk all the way to their tail risk. Having a view of the complete loss spectrum allows the market to develop more suitable capacity limits and pricing structures that reflect the complete profile of location(s) at risk.

Representation of the Most Damaging Sub-Perils

The RMS U.S. and Canada Severe Convective Storm Models provide output for hail, tornado, and straight-line wind peril losses, allowing (re)insurers to easily assess impacts, drivers, and severe storm risk by sub-peril. It is also the only model solution in the market that implicitly accounts for losses caused by lightning, which can add anywhere from 5 percent (e.g., single-family dwellings) to 80 percent (e.g., telecommunications) to the average annual loss of certain occupancy types.

Region- and Location-Specific Vulnerability

Informed by a combination of claims data, published research, post-event reconnaissance, and inputs from industry experts, the models contain over 800 individual vulnerability curves across 11 vulnerability regions, spanning thousands of combinations of primary characteristics and secondary modifiers. Regional variation of vulnerability is considered by using design codes, construction practices, data from the National Roofing Contractors Association, and expert engineering opinion. The variability takes into account roof age, roof type/material, and the application and enforcement of building codes.

Together, this functionality provides insight into the key drivers of structure, contents, and business interruption damageability. These insights span each sub-peril, supporting granular risk selection, benchmarking, or referral guidelines at the point of underwriting within and across regions, lines of business, and construction classes.

Validated Against a Wealth of Historical Data

The RMS U.S. and Canada Severe Convective Storm Models are informed by over $265 billion in industry loss data since 1990 and over $5 billion in location-level claims and exposure data. This is in combination with spatial hazard patterns with published sources and thousands of wind and hail observations from industry events.

The models have also been reviewed by leading industry experts in severe convective storm meteorology and wind vulnerability: Dr. Harold Brooks of the National Severe Storms Laboratory and Tim Marshall of Haag Engineering. As a result, the market can validate modeled losses against historical experience, supporting accurate insights into potential losses to enable pricing decisions, support rating agency discussions, and determine reinsurance limit needs with confidence.

Find Out More

Ask your RMS sales or customer services representative for more information on the RMS U.S. and Canada Severe Convective Storm Models, or email **sales@rms.com**.